

291449
Rec'd
12/17/03

Aircraft Certification Service
TAD 'SHORT' WORKSHEET

SFAR 88
2003-NM-280-AD

DOCKET NUMBER:

TECH WRITER:

Ad-faying-fuel tubes

Manufacturer Service Information/Revision/Date (Attach 2 clean copies):

FAA-04-18759-5

PROPOSED CORRESPONDING ACTION:

☐ Emergency AD

☐ Immediately Adopted AD

☒ Notice of Proposed Rulemaking

☐ Final rule after NPRM
(If FRAN, complete Attachment A.)

☐ Other (No-Notice Final Rule)

Is this action one of the following?

☐ Supersedure of AD (Docket No. _____)

☐ Revision of AD (Docket No. _____)

☐ Supplemental NPRM (Docket No. _____)
(If any of the above is checked, complete Attachment B.)

ACO Project Engineer Name/Title: Sulmo Mariano / Aerospace Engineer
Branch: Propulsion Telephone: (425) 917-6501

For each AD item numbered below, provide draft text and/or SB references. WHERE POSSIBLE, answer items using markup of SB, & mark with the AD item number.

1. Model, Applicability, # Airplanes (both U.S. & worldwide) - Refer to SB; state any differences for this AD:

Applicability:

Models: 707-E3A, 707-100, 707-100B, 737-300, 707-300C, 707-320B and 720

Models 737-100, 737-200, 737-200C, 737-400, 737-500; and

Models 747SP, 747SR, 747-100, 747-100B, 747-100BSUD, 747-200B, 747-200C, 747-200F, 747-300, 747-400, 747-400D and 747-400F

U.S. airplanes: 53 Model 707 & 720 airplanes; 1095 Model 737 airplanes and 253 Model 747 airplanes

Worldwide airplanes: 297 Model 707 & 720 airplanes; 2884 Model 737 airplanes; and 1122 Model 747 airplanes

AD Summary and Discussion Sections:

2. What has the mfr told the FAA?

"The FCAA advises that ..."

Describe background/events that prompted the AD in 1-2 sentences. Refer to SB 'Reason.'

During an electrical bonding and grounding test of 747 wing fuel tank penetrations of in-service airplanes, the engine fuel feed tube penetration fittings were found not to be electrically bonded to the front spar. This same condition has been found on all models of 707 & 720 airplanes and certain models of 737 airplanes.

Also, an inspection has found that lightning can attach to the filler caps for wing tanks No. 1 and 4 and the center wing tank on Models 707 and 720 airplanes because of their relative location on the airplane. It is necessary to ensure that the overwing fuel filler caps are properly bonded to the airplane structure. Otherwise, in the event of a lightning strike it could create arcing and ignition of fuel vapors in the fuel tanks which could result in a fuel tank explosion.

3a. What is the unsafe condition AND its cause?

"These actions are intended to prevent..."

Describe unsafe condition and its cause in 2-3 sentences (non-technical terms). Refer to SB 'Reason.'

If the fuel tank penetrations fittings are not electrically bonded with the spar, or for models 707 & 720 airplanes the overwing filler caps are also not electrically bonded to the airplane structure, there is a potential for arcing at the interface between those components and the airplane structure during a lightning strike event.

3b. What is the effect on the airplane?**"...which could result in..."***Provide a 1-sentence description; use non-technical terms.*

Arcing or sparking inside a fuel tank could cause ignition of a flammable fuel-air mixture and subsequent catastrophic explosion of the wing fuel tank.

4. What is the proposed corrective action?**"This AD proposal would require..."***Describe top-level action(s) - modify, inspect, etc - in non-technical terms. Refer to SB 'Reason.'*

This AD proposal would require preparation of the electrical bonding faying surfaces between the fuel feed tube fittings at the wing front spar where the fuel feed tubes penetrate the spar, and measurement of electrical resistances. Also, on Models 707 and 720 airplanes, this AD proposal would require to do an electrical resistance check of the overwing fuel filler caps for wing tanks Nos. 1 and 4 and the center wing tank; if that resistance is higher than a prescribed value corrective actions are necessary.

AD Relevant Service Information Section:**5. Describe top-level actions in the SB(s).****"The manufacturer has issued..."***Refer to SB(s) 'Description' (or Item 2, if proposed AD action is same as SB).*

Boeing has issued the following Service Bulletins:

A3505, dated November 1, 2001, applicable to 707 and 720 airplanes presents the instructions to electrically bond the fuel feed tube fittings at the wing front spar. The above service bulletin requires to prepare the electrical bonding faying surfaces at the forward and aft side of the front spar where the fuel feed tubes penetrate the spar. This task requires to clean the spar exposing bare metal and applying an electrically conductive protective coating on the spar surface, and to clean the bulkhead fitting. After the bulkhead fitting has been installed back in the spar, the electrical resistance between the bulkhead fitting and the spar web must be measured. After the fuel feed tubes are re-installed, a check for fuel leaks must be accomplished; no fuel leaks are permitted.

3513, dated November 6, 2003, applicable to 707 and 720 airplanes presents the procedures for conducting a resistance check between the overwing fuel filler caps for wing tanks Nos. 1 and 4 and center wing tank, and the structure, and rework if necessary.

737-28A1174, Revision 1, dated July 18, 2002, describes the procedures to electrically bond the fuel feed tube fittings at the wing spar. These procedures are similar to those of service bulletin A3505.

747-28A2239, Revision 1, dated October 17, 2002, applicable to all series of 747 airplanes from line number 1 through line number 1283, describes the procedures to electrically bond the fuel feed tube fittings at the wing spar.

747-28A2245, Revision 1, dated August 21, 2003, applicable only to 747-400 airplanes line numbers 1284 through 1300, and 1308, 1313, 1320 and 1321. During accomplishment of Service Bulletin 747-28A2239 at the factory, sealing the associated couplings and fittings was not done on airplanes line numbers 1284-1300, and on 1308, 1313, 1320 and 1321 on the exterior of the wing tank. Service Bulletin 747-28A2245 provides the instructions to do the rework, i. e., to check the electrical resistances and apply the sealant as necessary.

6. (Yes or No) Is the corrective action required in this AD considered to be interim action?

No

7. (Yes or No) Is this action considered 'sensitive, or is it related to a Safety Recommendation?*(If yes, state why sensitive, and/or provide copy of FAA/NSTB Safety Recommendation.)*

No

8. AD Differences Section (if needed):**"This AD differs from the SB"**

Check if : Flight with Cracks ____; Mandate Terminating Action ____; Contact Mgr, FAA ____;
 Compliance time ____; Mandate AFM Action ____; Contact Mgr/FAA ____

Describe any other differences between service bulletin and this proposed FAA AD.

Boeing Alert Service Bulletins A3505, 737-28A1174, Revision 1 and 747-28A2239, Revision 1 recommend that operators do the service bulletin at the earliest opportunity where manpower, materials and facilities are available, ~~instead~~ Boeing Alert Service Bulletin 747-28A2245, Revision 1, and Boeing Service Bulletin 3513 recommend that operators do these service bulletins within 5 years after the release date of the service bulletins. This AD would give operators five years after the effective date of the AD to complete the actions required by the AD.

AD Cost Impact Section:

9a. Work hours for corrective action(s) required: (List hours or reference SB 'Manpower').

For Models 707 & 720 airplanes: 18 man-hours per airplane

For Model 737 airplanes: 33 man-hours per airplane

For Model 747 airplanes: 96 man-hours per airplane

9b. Parts Cost, if any: (List costs or reference SB 'Material - Cost and Availability').

The parts and materials needed to do the actions of this AD are supplied by the operators; no special kits are necessary.

AD Body Section:

For EACH corrective action, mark up SB, if usable -OR- fill out Corrective Action Table below.

10a: Action # 1

What is the corrective action?

- (a) Within 5 years after the effective date of this AD prepare the electrical bonding faying surfaces on the forward and aft surfaces of the front spars of the fuel tanks of the left and right wings, including but not limited to the actions specified in paragraphs (a)(1), (a)(2)(i) or (a)(2)(ii) of this AD, as applicable, per the applicable Boeing alert service bulletin, excluding evaluation form, listed in Table 2 of this AD.
 - (1) For Model 707 and 720 series airplanes and Model 737 series airplanes:
Drain the fuel tanks and remove the fuel feed tubes and fuel manifold, remove the bulkhead fittings, clean the fittings and front spars areas by sanding down to bare metal, apply protective finish, re-install the bulkhead fittings, measure the electrical resistance between the front spar and the bulkhead fitting and repeat the preparation of the faying surfaces if the bonding resistance is higher than the threshold specified in the applicable alert service bulletin listed in Table 2; re-install the fuel feed tubes and fuel manifold, apply sealant to the bulkhead fittings and fuel feed tubes, and apply finish to the front spar, per the applicable alert service bulletin listed in Table 2.
 - (2) For Model 747 series airplanes.
 - (i) For all series of 747 airplanes from line number 1 through line number 1283: Drain the fuel tanks and remove the fuel feed tubes and bulkhead fittings, prepare the surfaces for electrical bonding, shot or flap peen the inside surrounding padded area of the tube penetration on the front spar, apply protective finish to all bare metal surfaces, re-install the fuel feed tubes and bulkhead fittings with new o-rings, measure the electrical resistance between the bonding surfaces and repeat the preparation of the faying surfaces if the bonding resistance is higher than the threshold specified in the applicable alert service bulletin listed in Table 2; and apply sealant, per Boeing alert service bulletin 747-28A2239, Revision 1, dated October 17, 2002.

- (ii) For 747-400 airplanes from line number 1284 through 1300, and line numbers 1308, 1313, 1320 and 1321: Test and measure the electrical bonding resistance between the engine fuel feed bulkhead fitting and the structure. If the electrical bonding resistance passes the requirements, apply sealant on the hex nut of the bulkhead fittings outside of the tank on front spar (inboard and outboard), and on the pipe coupling inside the tank (outboard only), and return the airplane to a serviceable condition in accordance with Boeing Alert Service Bulletin 747-28A2245, dated August 21, 2003. If the above test does not pass the electrical bonding requirements, or whenever this electrical resistance is higher than 0.001 ohms including after rework, rework and remove existing wing tank fuel feed tubes, clean and prepare the front spar bulkhead for bonding, bond the tubes to the front spar, apply sealant to the bulkhead adapter, retest for bonding resistance, apply sealant to the bulkhead adapter fittings and reinstall the tubes, in accordance with Boeing Alert Service Bulletin 747-28A2245, dated August 21, 2003.

(b) Before further flight after accomplishment of paragraph (a) of this AD: Service the fuel tanks and examine for signs of fuel leakage per the applicable Boeing alert service bulletin, excluding evaluation form, as listed in Table 2 of this AD. Correct any leaks found before further flight, per the applicable service bulletin listed in Table 2.

What is the compliance time ?
What is repetitive interval?

Five years after the effective date of this AD.
None.

10b: Action # 2
What is the corrective action?

(c) Within 5 years after the effective date of this AD measure the electrical resistance from the filler adapter of the overwing fuel port to the upper wing skin on Model 707 and 720 airplanes. If the resistance is less than 0.005 ohms do the actions described in Work Package I, Work Instructions of the Accomplishment Instructions of Boeing Service Bulletin 3513, dated August 21, 2003. If the resistance is more than 0.005 ohms do the actions described in Work Package II, Work Instructions of the Accomplishment Instructions of the above service bulletin.
Five years.

What is its compliance time?
(Add grace period if not available)
What is repetitive interval?

For Model 707 and 720 series airplanes, the electrical resistance check from the filler adapter of the overwing fuel port to the upper wing skin must be repeated every 14000 flight-hours.

Table 2

| Model | Service Bulletin | Applicability | Revision Level | Date |
|---|------------------|--|----------------|------------------|
| 707 and 720 series | A3505 | As listed in the service bulletin | Original | November 1, 2001 |
| 707 and 720 | 3513 | As listed in the service bulletin | Original | November 6, 2003 |
| 737-100/0200/-300/-400/-500 series | 737-28A1174 | As listed in the service bulletin | 1 | October 17, 2002 |
| 747-SP/-SR, 747-100/-100B/-100BSUD/-200B/-200C/-200F/- 200 -400/-400D/-400F series | 747-28A2239 | From line number 1 through line number 1283 | 1 | October 17, 2002 |
| 747-400/-400F series | 747-28A2245 | From line number 1284 through line number 1300, and line numbers 1308, 1313, 1320 and 1321 | 1 | August 21, 2003 |

11. (Yes or No) Should corrective action(s) required in this AD to be applied to spares as well?

Not applicable.

12. Should a ferry flight permit be: ☒ Permitted ☐ Permitted with limitations* ☐ Prohibited

*List limitations.

13. Check the category that best describes the cause of the unsafe condition addressed by this AD:

☒ Design Problem ☐ Unapproved Parts ☐ Operational
☐ Maintenance ☐ Quality Control Problem** ☐ Other (specify):
 **Reporting Req't Needed? _____

This problem is due to a design oversight. There never was a design requirement to prepare the faying surfaces.

14. Circle the appropriate response:

☒ **Yes** or ☐ **No** Does this action affect the Presidential fleet?

☐ **Yes** or ☒ **No** Does this action affect the FAA fleet?

☐ **Yes** or ☒ **No** Was this action prompted by the use of suspected unapproved parts (SUP)?